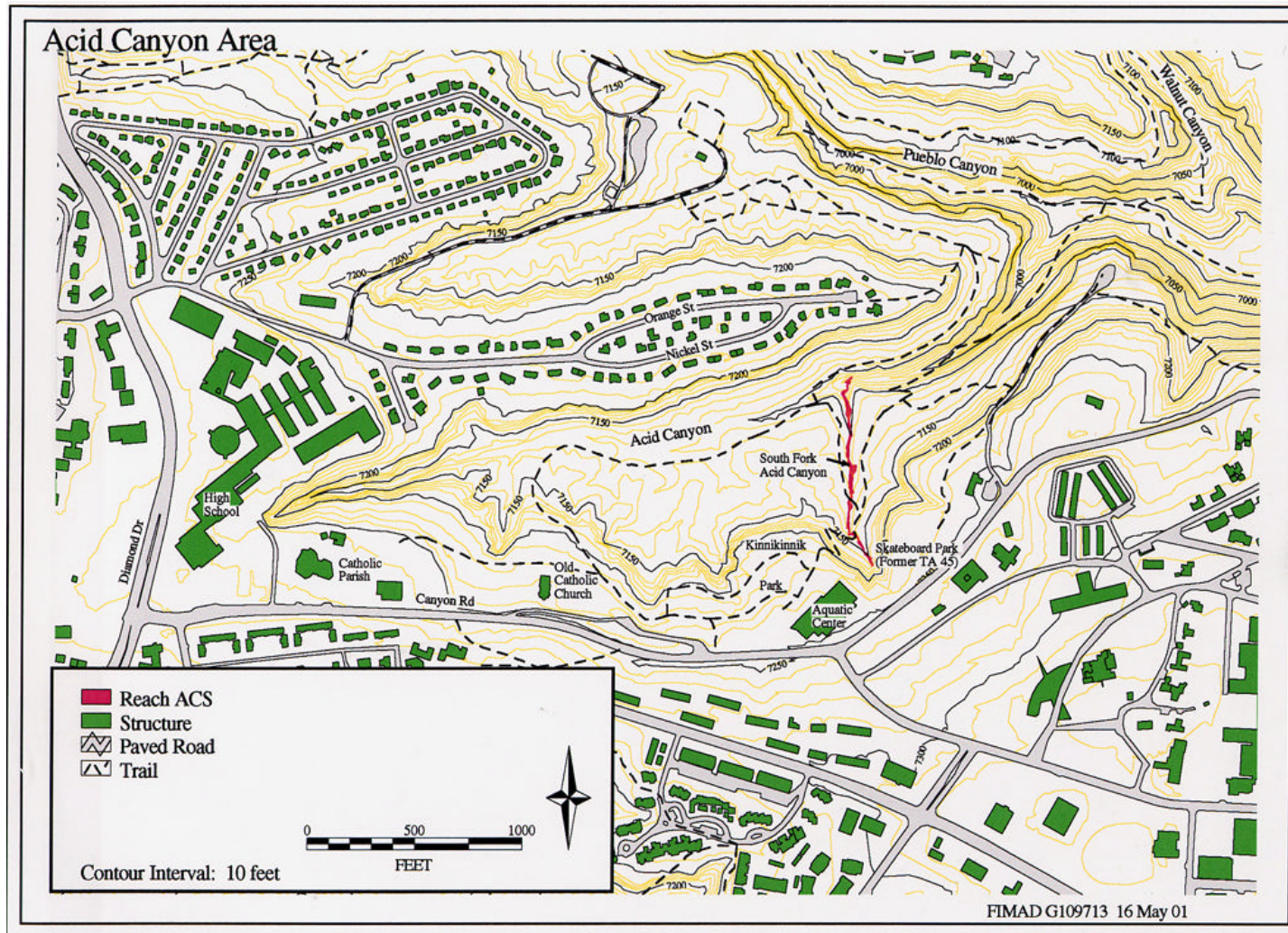

Acid Canyon Cleanup Activities

**Steven Reneau
Earth and Environmental Sciences Division
Los Alamos National Laboratory**

**ER Project Quarterly Meeting
December 5, 2001**

Acid Canyon Area



Manhattan Project



Effluent Releases into Acid Canyon

- ❑ 1946 photo of discharges from original Manhattan Project facilities into Acid Canyon



Recreational Use



Site History

- ❑ **1944-1951: Release of untreated radioactive effluents from “acid sewers”**
- ❑ **1951-1964: Release of treated radioactive effluents from treatment plant**
- ❑ **1966: Decontamination and decommissioning of treatment plant -- 1st environmental cleanup**
- ❑ **1967: Land transferred to Los Alamos County**
- ❑ **1976-1977: Formerly Utilized Sites Remedial Action Program -- Additional cleanup**
- ❑ **1992-1993: ER Project sampling**
- ❑ **1995-1996: ER reports -- No need for cleanup**

Site History

- ❑ **1999: New Mexico Environment Department sampling -- Higher levels of plutonium found**
- ❑ **November 1999: Additional ER sampling**
- ❑ **December 1999: EPA sampling**
- ❑ **April 2000: ER report -- Confirmed relatively high levels of plutonium, but risk analysis showed no unacceptable radiation dose**
- ❑ **September 2000: DOE directed ER to plan cleanup under ALARA guidelines**
 - **“As Low As Reasonably Achievable”**

Cleanup Plan

- ❑ Interim Action Plan completed and approved by DOE August 2001
- ❑ Goal: Drop levels of Pu-239,240 to <280 pCi/g
 - Goal supported by:
 - ◆ Northern New Mexico Citizen's Advisory Board
 - ◆ Los Alamos County
- ❑ Cleanup method: Vacuuming
 - Minimize environmental disruption
- ❑ Site preparation began August 22, 2001
- ❑ Sediment removal began September 12, 2001
- ❑ Sediment removal completed November 8, 2001



















Personal Protection

☐ Attire:

- coveralls, steel-toed boots, safety glasses, hardhats, gloves

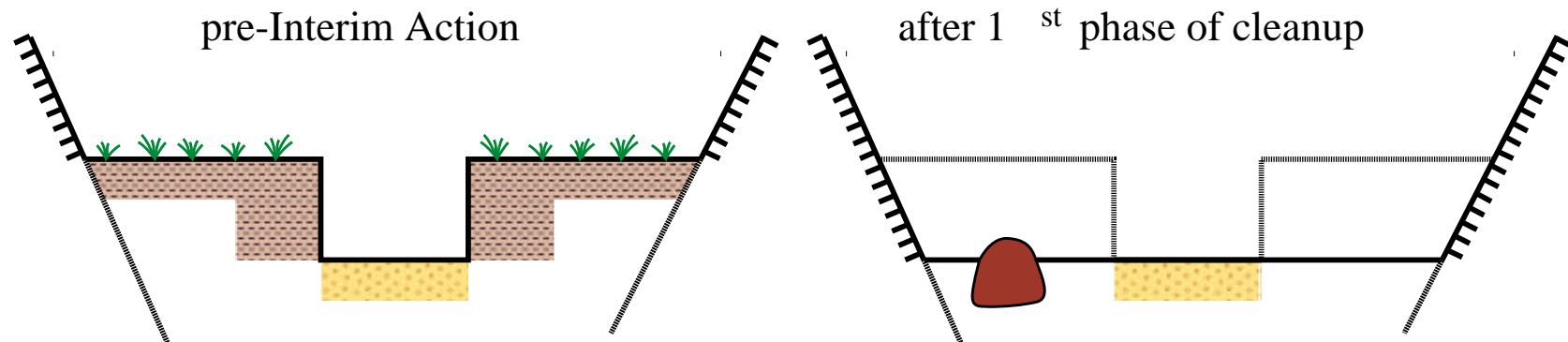
☐ Monitoring:

- Lapel monitors
 - ◆ Discontinued after 1st week
- Air monitors
- Personal screening



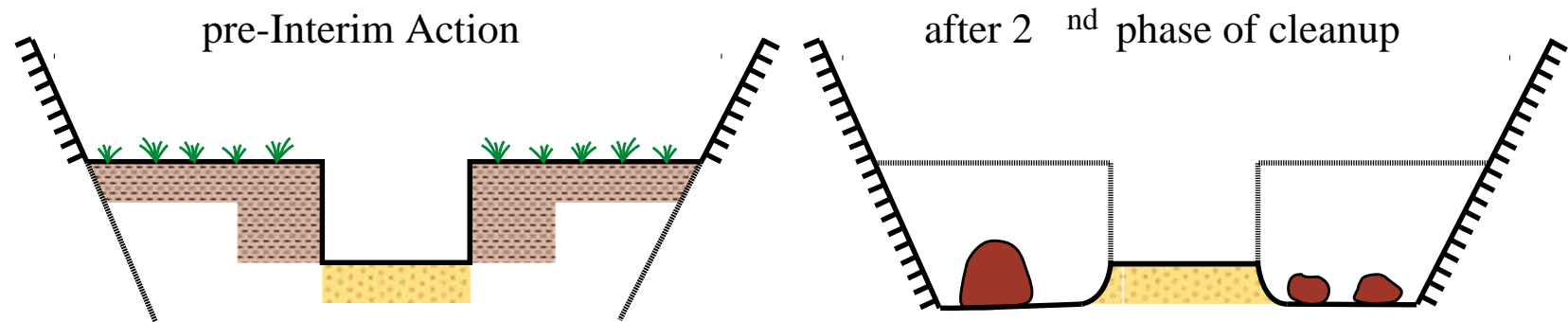
1st Phase of Sediment Removal

- ❑ Remove targeted sediment deposits to channel level



2nd Phase of Sediment Removal

- ❑ Remove sediment below floor of excavation that exceeds field screening threshold

























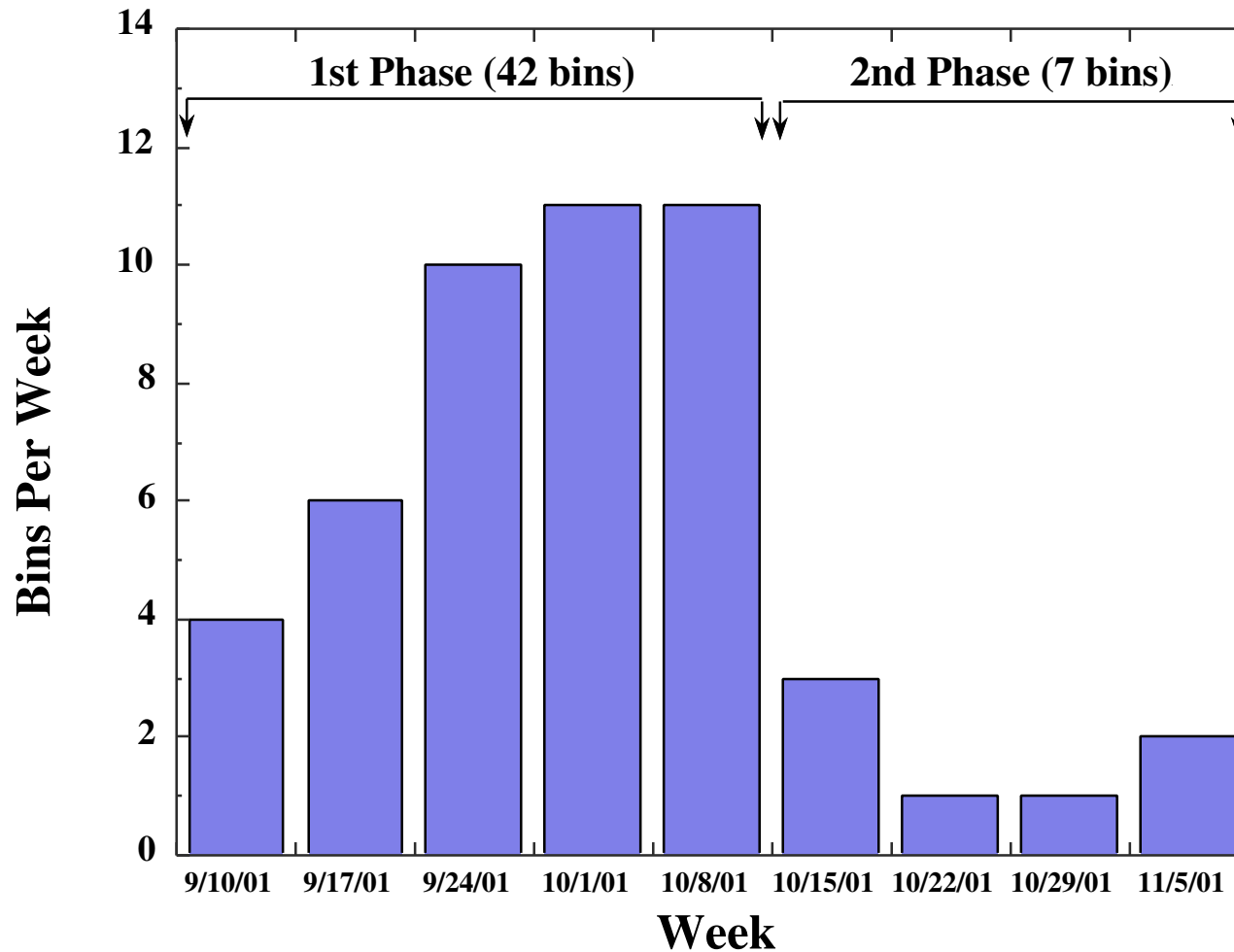








Phases of Sediment Removal



Field Screening

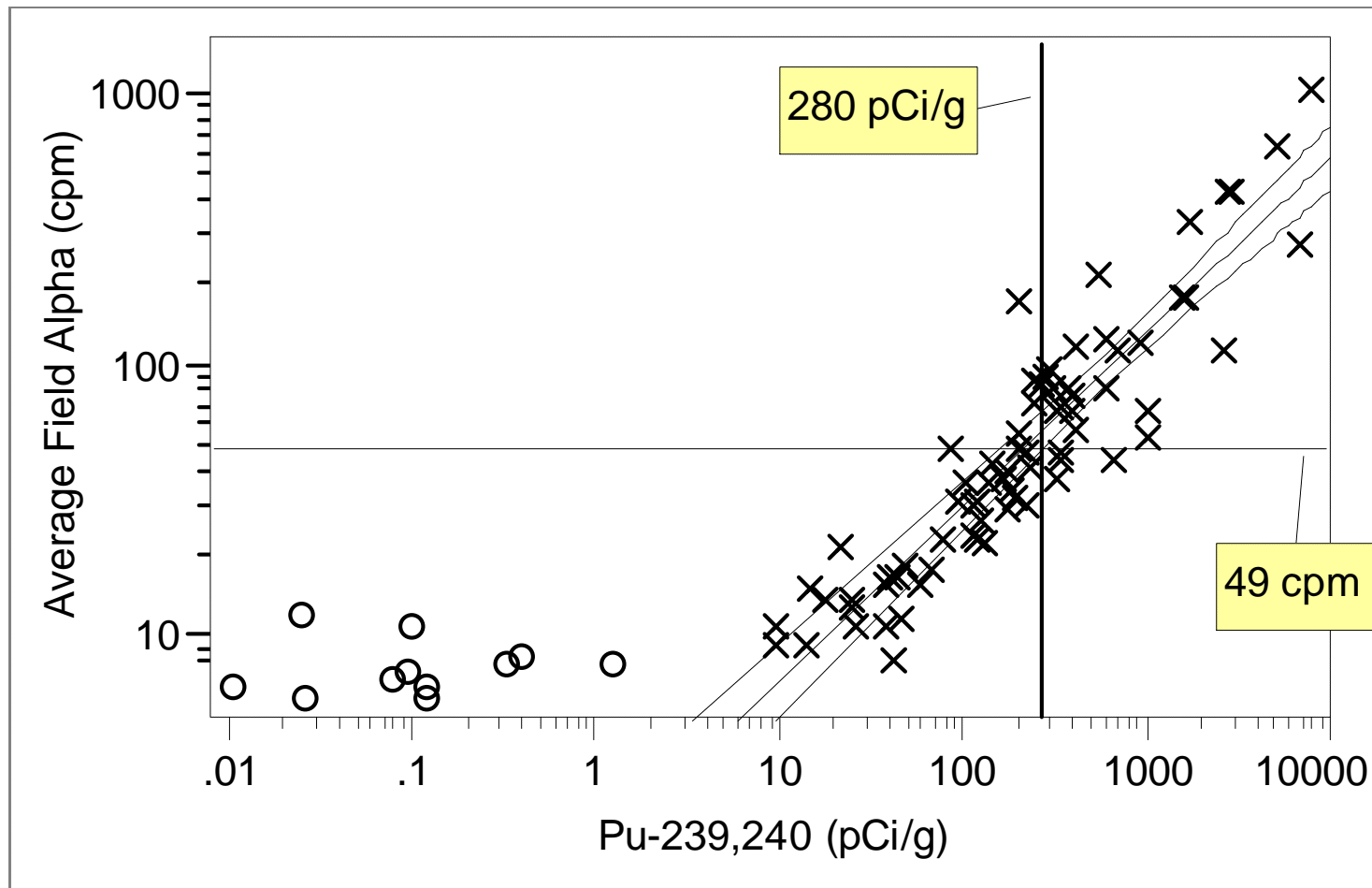
- ❑ Field measurements of alpha radiation
- ❑ Real-time evaluation of plutonium levels



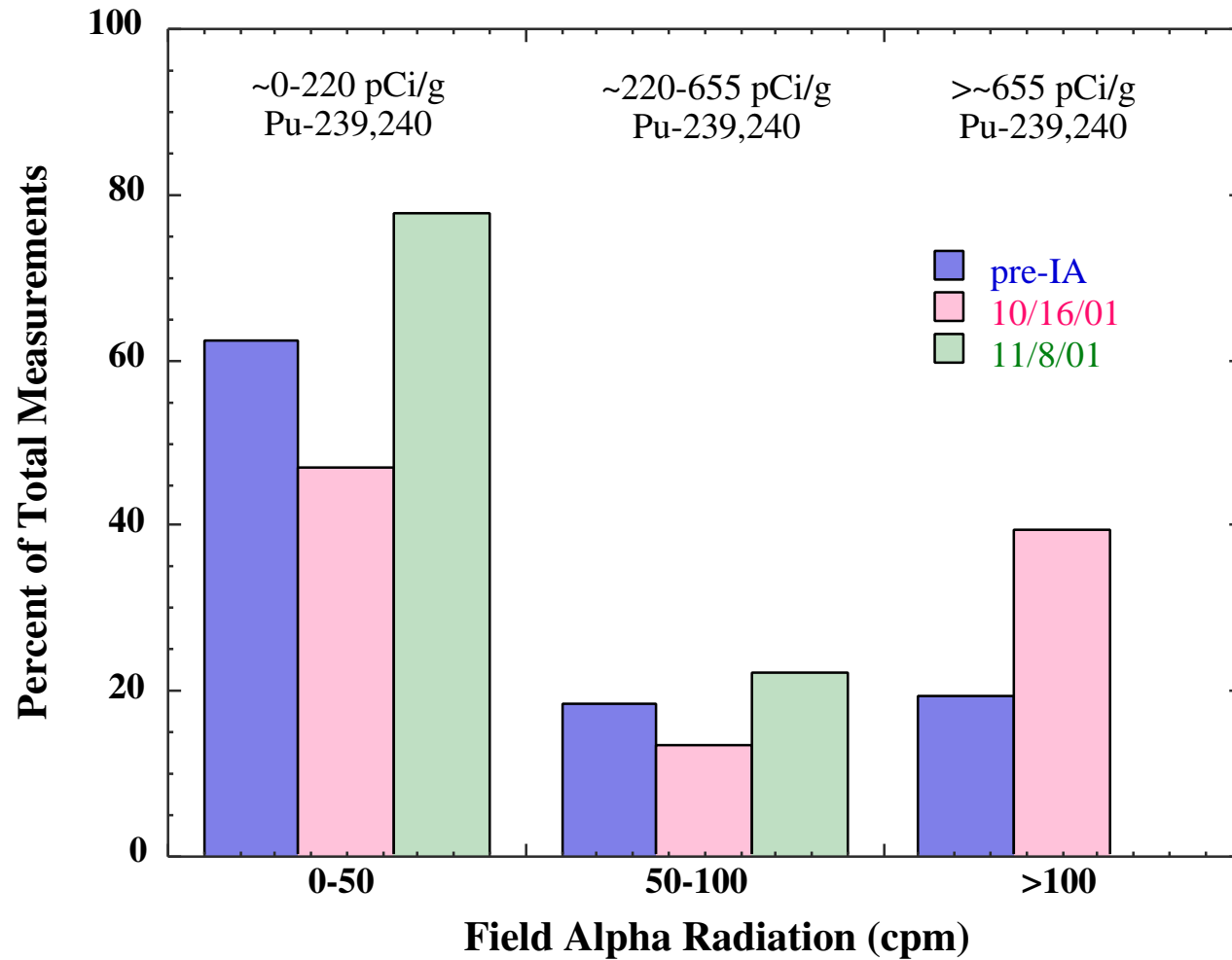




Field Screening



Radiation Levels Before, During, and After Cleanup



Cleanup Goal

- ❑ **Plutonium-239,240 concentration <280 pCi/g below floor of excavation**
 - **95% upper confidence level of the mean**
 - ◆ **Protective level based on statistical analysis of data**
 - ◆ **Accounts for uncertainty in estimates of the mean**
 - ◆ **Routinely applied in environmental cleanup activities**
 - ◆ **Follows guidance from New Mexico Environment Department and Department of Energy**

Steps to Verify Cleanup Goal

- ❑ **Field screening of base and sides of excavation**
 - >500 measurements
- ❑ **Sediment samples for gross alpha analyses**
 - 1-day turnaround
 - 66 samples
 - Provided extra confidence to allow demobilization
- ❑ **Samples for off-site plutonium analyses**
 - 30 samples collected by ER
 - ◆ Larger analyte suite obtained in 12 samples
 - 17 samples collected by NMED & EPA





Estimated Post-Cleanup Levels

- ❑ **Estimated Plutonium-239,240 after cleanup**
 - **Based on gross alpha analyses of confirmation samples**
 - **Mean ~100 pCi/g**
 - **95% upper confidence level of mean ~140 pCi/g**
 - ◆ **<280 pCi/g cleanup goal**
- ❑ **Confirmatory sample results pending**

Site Restoration

- ☐ Smooth topography
- ☐ Mulch
- ☐ Seed
- ☐ Fertilizer
- ☐ Jute mat
- ☐ Quarterly inspections





















Conclusion

- ❑ **~490 cubic yards of sediment containing plutonium from early Laboratory operations removed from Acid Canyon**
 - Includes deposits above former channel level that had greatest potential for exposure to recreational users
 - Also includes deposits previously buried beneath channel level
- ❑ **Cleanup report to be prepared in spring 2002 following receipt and assessment of confirmation sample data**



For further information or
comments please contact the
Environmental Restoration
Project Communications and
Outreach Team:
(505) 665-6770
<http://erproject.lanl.gov>